

# Training Technotherapists for Use in an Urban Dental Care Program

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THE expansion of duties for dental auxiliaries in the United States is a concept whose time has seemingly arrived. Conversion and implementation of this concept into significant action programs, however, have been exceedingly slow. As of June 1970, only a handful of States had altered their dental practice acts to allow expansion of duties for auxiliaries (1), and few of these changes were really significant.

Four years after the amendment to the Dental Practice Act, no programs are yet available in Pennsylvania which would increase the number of trained technotherapists to assist dentists in private practice, institutions, or government programs other than the pilot training program of the dental division of the Philadelphia Department of Public Health. The programs given at Temple University and the University of Pennsylvania are used primarily for the teaching of students.

The principles for a service program have been known and demonstrated for years, but the implementation or practice of these principles had not been previously exercised in the United States.

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Because of the regulatory change in 1967 in the Pennsylvania Dental Practice Act, there is no legal barrier to expanding the duties of unlicensed auxiliaries. The training program could also serve to demonstrate further to the profession the practical application of the training and use of a new type of dental health auxiliary, and we hope that it will stimulate various institutions and professionals to train and use dental technotherapists.

## Task Analysis Important Tool

We believe that the approach to training auxiliaries should be one where ultimate tasks and responsibilities of various job categories and professions are determined, defined, and documented. The training and educational process is then programmed to be vital and relevant to those tasks and responsibilities. The health professionals are "discovering" task analysis of which the foregoing two statements are a part. The depth, scope, and method of task analysis, however, should and will vary according to the individual tastes of program directors, the program structure, the degree of institutionalization, and the degree of definition of the desired product.

In July 1969, the division of dental health started a program to train and use dental technotherapists (our expanded duty auxiliary) in its dental care activity. Various studies (2-4) have shown that dentists who do primarily operative dentistry can significantly increase their output, above and beyond employment of a maximum number of chairside assistants and receptionists, by using this new type of auxiliary. This auxiliary

under supervision would perform intraoral tasks formerly done by the dentist. For example, the following tasks are indicative but not wholly inclusive of the type of activity to be delegated: (a) place and remove rubber dam; (b) place, wedge, and remove a matrix; (c) condense, carve, and finish an amalgam restoration; (d) insert calcium hydroxide and cement bases; (e) polish restorations with burs, discs, pumice, and tin oxide; (f) expose, develop, and mount dental X-ray films; and (g) give instructions in home care.

Though technotherapists could easily be trained to assist and render services in all areas of dentistry, we limited our training program, at least the initial class, to operative dentistry because our priority of care and the bulk of our dental activity requires restoration of carious teeth of children 6 to 12 years of age. The technical tasks needed in operative dentistry require proficient manual dexterity. Therefore, we believed that if our students could master this area of dentistry and gain confidence by working in the mouth, it would be a relatively simple matter to expand their training to other areas of dentistry if and when our program priorities and needs change. This additional training could be given through the short periods of inservice training which we now conduct once or twice a year.

### **Goals and Objectives of Program**

We wanted to develop and implement a training program as quickly as possible. Inherent in the activity was the need to obtain answers and solutions to questions and problems regarding the curriculum and planning and the need to set up a mechanism to administer such a program. To achieve a working model, we set up the following goals and objectives.

*Program goals related to the project*—(a) to expand the role and function of the dentist in order to increase his productivity and to best use and extend his services; (b) to reduce overall cost per unit of service to allow further expansion of services within a fixed budget; (c) to maintain or improve the quality of technical services provided.

*Short-term objectives of training program*—(a) to develop a short-term training program for dental technotherapists; (b) to teach dental assistants certain tasks previously performed only by dentists; (c) to train dentists to use trained dental technotherapists effectively and efficiently; (d)

to evaluate results of training by evaluating the performance of the dentist-technotherapist team approach to the delivery of dental services.

*Long-term objectives*—(a) to develop and use a team concept of delivering dental services in a public health program by using more and different types of auxiliaries and fewer dentists; (b) to explore newer concepts in facility design and equipment arrangements.

Because of the limited number of studies in this area and because of a lack of relevant published material, questions to be answered were as follows: How long should the training period be? Who should teach it? What should be taught? Where? What kind of facilities, equipment, and supplies are needed? Should it, can it, or is it desirable for this kind of activity to be taught outside the dental school arena? Who should be selected or permitted to receive such training? How will the curriculum for this particular kind of technical auxiliary affect the structuring of the curriculum for the dentist and other dental auxiliaries in the future? What methods of evaluation are to be used? What are the administrative problems? These are a few of the many questions that are being asked and for which we are attempting to seek answers. By our activities we hope to add our experience to the existing core of knowledge in this subject area.

Cost, one major area, was immediately resolved. There was no money for the program, and we would either have to use existing resources or abandon the project.

During the development stages of our planning at least six definable areas appeared and required resolution to implement our plan. The definable areas of concern were (a) selection of candidates, (b) curriculum, (c) faculty, (d) facility, and (e) evaluation.

### **Selection of Candidates**

The first class was limited to four persons because of space limitations, lack of staff, and various other factors. Candidates were selected from a group of 17 dental assistants employed by the division of dental health in its incremental dental care program.

This group of 17 was selected from the 26 dental assistants in the program. The minimum qualifications for eligibility were expression of a desire to enter the training program and graduation as a dental assistant from an approved school—plus 6 months' experience in the division's pro-



**Technotherapists train in health center equipped with multiple chairs**

gram or 1 year's experience as a dental assistant in the division's program. Eight persons either were not interested or did not have the minimum qualifications.

The four candidates from the group of 17 were selected because they met the following criteria:

1. Their past performance record was good.
2. They were recommended by the district dental supervisors.
3. Their attendance records were satisfactory.
4. They satisfactorily passed the oral interview.

No written examinations or examinations to ascertain manual dexterity were given or required. The women selected had already had 2 to 12 years of experience as dental assistants although none were, or are now, certified dental assistants.

## Curriculum

*Curriculum planning.* Our first need was to develop a curriculum. After examining various curriculums, it was obvious that the length, depth, and scope of professional courses and training programs were related to preconceived standards. These standards were geared to the person's licensing, certification, and relative position in the professional hierarchy rather than to a practical objective of the desired and required level of performance. In short, the period of training for most health professionals is far too lengthy when measured by the needs of the job. Unfortunately many curriculums are inflexible by predetermined

formulas, and they tend to remain static over time.

Prospective health workers have to ingest and regurgitate much information and participate in many activities which are irrelevant to the career and responsibilities for which they are trained. Goldhaber, dean of the Harvard School of Dental Medicine, stated it succinctly when he said ". . . most dentists are overeducated for what they do and undereducated for what they ought to be doing" (5). Careful observation would support Goldhaber's comments when related not only to dentistry but also to practically any category of position in the health service area.

Nevertheless, we need to seek methods of reducing training time and "cutting the fat" and extraneous material out of course content. Jason (6) has stated that ". . . being a student *should* imply that one is, at all times, practicing the very activities for which one is preparing." Generally speaking, we have failed to achieve this goal in medical and dental education and, as a matter of fact, in all education. Our training activities are based on the philosophy that we should structure an environment of practice for the activity for which the student is preparing.

Our planning and development of the curriculum evolved from the following sources and ideas:

1. Conceptualization derived from past experiences in the field of clinical dentistry.
2. By determining and listing the exact duties the technotherapists were to perform, we programmed the basic didactic and laboratory material we believed was necessary to give the students the essential academic and manual skills to do the job. For example, in future classes more time will be devoted to familiarizing the students with dental materials and manipulation of amalgam and less time to general anatomy.

3. The curriculum used in a continuing education course at the University of Pennsylvania, March–April 1969 (personal communication, Dr. Virginia Parks, operative dentistry department) and the Dental Clinic Center, Public Health Service, Louisville, Ky. (personal communication, Dr. William Simon, director, fall 1968), provided some basic ideas in development of our curriculum. The course given at the University of Pennsylvania was designed for dental assistants employed in dental offices and was given 2 nights a week, 2½ hours each night, for 13 weeks. Students, however, received little, if any, practice

with patients. This course was dropped from the continuing education curriculum after the first year.

The curriculum at the Dental Clinic Center, Public Health Service, Louisville, Ky., offered 200 or more lecture and laboratory sessions. The total training period was 2 years, although they did experiments with shorter periods, and their students were trained to perform a great variety of procedures.

When all the ideas from these sources were analyzed and edited, we determined the content and length of the didactic, laboratory, and preliminary sessions in the clinic that would be necessary to give the students sufficient knowledge, skills, and confidence to move on to the field training phase of the program. The curriculum was divided into two phases. Phase 1—primary training—was planned for 3 weeks (this period was extended to 4 weeks when the training was actually implemented) and included lectures, laboratory training, and preliminary clinical experience. Phase 2—supervised field training—was planned for 3 to 6 months, depending upon the progress of the group in meeting the performance standards that we require for our program and which civil service examinations of the city of Philadelphia require for dental technotherapists.

A list of subjects presented in phase 1 follows:

#### Introduction

Anatomy of permanent molars

Chairside assisting and patient control

Dental physiology

Class 2 and compound amalgam restorations

Polishing amalgam restorations

Tooth isolation (rubber dam)

Anatomy (head and neck)

Anatomy of deciduous molars

Anatomy (trigeminal and facial nerve)

Class 5 amalgam and dental materials

Class 1 amalgam, quadrant dentistry, prophylactic odontotomy

Eruption of teeth

Anatomy—arteries supplying teeth and oral cavity

Emergency treatment in dental office

Dental X-rays

Polishing teeth and toothbrushing instruction

Anatomy—veins of head and neck

Anatomy—maxillary 1st deciduous molars

Library research and study period

Examinations

Anatomy (deciduous central incisors)

Operating positions (use of mirror and explorer)

Anatomy of central incisors

Calcium hydroxide and cement base

*Curriculum implementation.* With some modifications the basic curriculum was implemented as it had been planned originally.

As previously mentioned, phase 1 (the primary training period) was extended 1 week for a total of approximately 4 weeks (19 working days) from July 22, 1969, to August 15, 1969.

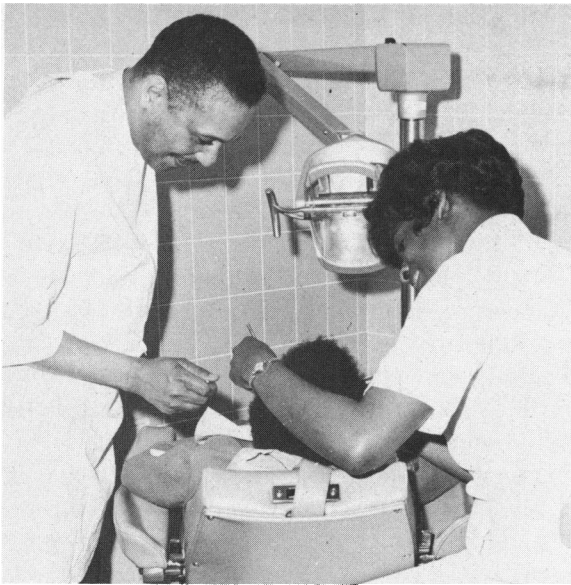
This change was effected primarily to give all students more experience and exposure to working in the mouth. It also gave the slower students a chance to become more proficient before advancing to phase 2.

The sequence of lectures was changed slightly to accommodate the faculty. (Curriculum schedule is available from the Division of Dental Health, Philadelphia Department of Public Health, 500 South Broad St., Philadelphia, Pa. 19146).

Phase 2 took longer than we had anticipated, probably because of our inexperience with this kind of activity, appearance of unanticipated problems, lack of staff which could be assigned to the project on a full-time basis, delays in receiving supplies and equipment for training, and lack of



**Technotherapist prepares tooth for restoration**



**Technotherapist examines teeth for caries**

ideal facilities. We had not set a specific time for this phase. We visualized a period of about 3 to 5 months. In actuality, however, phase 2 extended from August 18, 1969, through March 5, 1970, a period of approximately 6½ months.

We believe that certain persons in the group were ready for "graduation" much before 6½ months. Others, however, were not. Therefore, the period was extended to 6½ months to bring all members of the group to a fairly comparable level of quality in their performance, which was determined by the project director and coordinator. With more experience no doubt phase 2 can easily be implemented within the 3- to 5-month period originally envisioned.

The training hours in phase 1 were as follows:

<i>Activity</i>	<i>Hours</i>
Didactic .....	31
Laboratory .....	65
Clinical experience .....	35
Total .....	131

Some clinical experience is included in the total laboratory hours, but the bulk of the 65 hours was spent in performing practical laboratory procedures, and vice versa some of the clinical hours were spent sharpening technical skills in the laboratory.

## **Faculty**

The faculty was chosen from the professional personnel available in the division of dental health and consisted of the following broad classes:

public health dentists, dental supervisors, clinical dentists, and a dental hygienist.

One of us (N.D.P.) was given primary responsibility for developing, coordinating, and implementing the program.

All persons of the teaching staff except the clinical dentists gave at least one lecture. The clinical dentists were primarily responsible for the laboratory and the preliminary clinical part of phase 1. Approximately 50 percent of the staff who gave lectures had taught previously in a dental school, and 75 to 80 percent of the laboratory and preliminary clinical sessions were given by instructors who had 2 to 5 years teaching experience in a dental school.

The district dental supervisor supervised the clinical dentist-student technotherapist team. The director, division of dental health, was responsible for overall direction of the program. The faculty-student ratio was 1:1 most of the time. If the ratio was not 1:1, it was 3:4 and never went below 1:2.

## **Training Facility**

For convenience, the lecture and laboratory space selected for phase 1 was close to the health center where dental services were being delivered, because part of the curriculum was designed to give the trainees early contact with patients. This proximity would also allow us to correlate classroom and laboratory material. By the second afternoon, the trainees were using mirrors to inspect various anatomical landmarks in the mouth and to observe and study the anatomy of various teeth described in the lectures, of which they were carving models in the laboratory. By the sixth laboratory period or third day of training, the students began practicing operating positions using plastic skulls attached to the headrests of conventional dental chairs. When they mastered the skills needed by using the plastic skulls, they practiced on each other and then ultimately on patients.

This format was followed until the students were proficient in all the technical procedures they were required to learn. When pertinent clinical situations did arise, the students would be called in from a laboratory or lecture room on many occasions to observe and practice, or both, a procedure which had been described in a lecture or laboratory session. This physical setup was adequate, although far from ideal.

Phase 2 field training facilities were located in

two separate health centers, both of which contained multiple-chair dental clinics. A supervisor, a clinical dentist, and two trainees were assigned to each of these facilities for approximately 3 months. By splitting the class, we believed that administration would be better and that closer supervision could be given the trainees and dentists in the early stages of field training.

The consensus at this point seems to be that future classes should not be split at any stage of the training even at the expense of not having as close supervision in the early phases of the training program. The contention is that the amount of close supervision received was not significant, and the split setup was more cumbersome to administer and coordinate.

## Evaluation

*Phase 1.* Phase 1 activity was evaluated by daily observation of students and by written examinations and practical review of carving and amalgam techniques. The greatest weight was placed on the carving and amalgam techniques.

*Phase 2.* The students' progress was evaluated by (a) daily training and observation by the supervisor and clinician, (b) periodic observation by the coordinator and director, (c) written examinations, (d) clinical examinations similar to the operative dentistry performance examinations which dentists are required to pass before entering our program (7), and (e) the ongoing method of evaluating the quality of amalgam restorations that are placed by dentists in our dental care program.

A significant aspect of our training of auxiliaries is that it is part of a long range plan to restructure the organization of the division of dental health to form a career ladder for auxiliaries. This program could have significant implications in regard to the point of entry of auxiliaries into the dental care system, could simplify the method of training, and reduce the amount of time needed in training.

Soricelli (8, 9) has detailed the results of evaluating the performance of technotherapists by the quality and quantity of dental services they render.

## Conclusion

In conclusion it should again be stated that this program was our initial attempt at training auxiliaries for expanded duties and for an extended

period. Heretofore, the presentation of annual short-term inservice training programs of 1-3 days had been the extent of our participation in projects for educating and training assistants. In future classes, certain refinements and changes in the curriculum will be made as a result of our experience.

We are planning to train more technotherapists, primarily because a need exists for many of these auxiliaries and training programs are still not available from any other source to the practicing dental community. (TEAM programs funded by the Public Health Service are directed at training dental students to function with expanded duty auxiliaries and are not intended to enlarge the expanded duty auxiliary pool that could become available to the practicing dental community.)

The described activity has demonstrated that when and where necessary, with adequate resources and facilities, the training of technotherapists in a public health program for use in such a program can be planned and implemented.

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